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EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE BIENVILLE NATIONAL FOREST, MISSISSIPPI

by

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INTRODUCTION

Periodic southern pine beetle, *Dendroctonus frontalis*, Zimm., outbreaks have been occurring in southern Mississippi (in and around the Homochitto National Forest) since the late 1950's. In January 1976, southern pine beetle infestations were detected for the first time on the Chickasawhay Division of the DeSoto National Forest.

In late August and early September, District personnel of the Bienville National Forest, Mississippi, detected SPB infestations on the Bienville and Strong River Ranger Districts. This is the first known occurrence of this insect on the Bienville N.F.

During the last two weeks of September 1976, the Forest Insect and Disease Management Group of the U. S. Forest Service conducted aerial surveys and subsequent on-site examinations on the Bienville N.F. The purpose of these surveys was to evaluate the status and trends of the existing SPB infestations on the Bienville N.F.

METHODS

Standard aerial sketch-map procedures were used for this evaluation.[2/] Aerial survey coverage was 50 percent. Spots of red and/or fading trees were recorded and accurately plotted on Forest Service Class A maps. Aerial survey results were then corrected according to the data of Aldrich *et al.* (1958) to compensate for observer error.

TECHNICAL INFORMATION

Causal agent - *Dendroctonus frontalis*, Zimmerman.

Host Trees Attacked - The southern pine beetle attacks all species of southern yellow pine. On this forest, however, loblolly pine, *Pinus taeda* L., and shortleaf pine, *Pinus echinata*, are the preferred hosts.

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2/ Detection of Forest Pests in the Southeast. 1970. USDA, USFS, SA, S&PF, Div. of FPM, Publ. S&PF 7, Atlanta, Ga. 51 p.

Type of Damage - Death of the tree is the result of cambial mining by the southern pine beetle as it constructs its gallery. The beetle also introduces blue stain fungi, *Ceratocystis* spp., which slow down or block conduction of water in the stem.

Life Cycle of the Beetle - The beetles attack in pairs and construct a winding gallery in the cambium. Eggs are deposited in niches along the sides of the galleries. The eggs hatch into whitish grubs that further mine the cambium and then construct cells in the bark for pupation. The callow adults then mine through the bark to emerge. The complete life cycle takes about a month during the summer and as many as seven generations may be produced in a year.

RESULTS AND DISCUSSION

The results of the Bienville R.D. and Strong River R.D. are summarized in Table 1. The greatest number of SPB spots on the Bienville R.D. were located north and northeast of Morton, Mississippi, while most of the SPB spots on the Strong River R.D. were located northeast of Raleigh, Mississippi. Several spots were also detected near the southwestern tip of the Strong River R.D. (Fig. 1). Total corrected number of SPB spots on the Bienville R.D. and Strong River R.D. was 131.7 and 93.2 spots averaging 9 and 5 trees per spot, respectively. In these infested areas, loblolly was the principal tree species affected.

The number of infested trees per M acres host type on U. S. Forest Service lands was 1.8 for the Bienville R.D. and 1.5 for the Strong River R.D. Of the total number of SPB spots ground checked on the Bienville N.F., 50 percent of the SPB spots were found to be active on the Bienville R.D. and 40 percent were active on the Strong River R.D. Seven of the 10 spots ground checked on the Strong River R.D. had lightning damaged trees and heavy populations of either Ips or black turpentine beetles. In these spots, species of Ips and/or black turpentine beetles appear to have been the primary invaders, and the SPB a secondary invader of the already weakened trees.

This does not appear to be the case, however, on the Bienville R.D. On this District, Ips and black turpentine beetles were not observed as primary invaders. Rather, the SPB was found to be initiating attacks even without the presence of lightning strikes or other readily observable stand disturbances. This tends to indicate that a much higher SPB population level exists on the Bienville R.D. than on the Strong River R.D.

The ratio of green infested to red and fading trees was found to be 0.11:1 and 0.57:1 for the Bienville and Strong River Ranger Districts, respectively. These figures may be a little misleading, however, since many of the larger SPB infested spots on the Bienville R.D. were salvaged before on-site examinations could be conducted.

Table 1. Summary of aerial and ground survey data, southern pine beetle evaluation, Bienville N.F., Mississippi

	Ownership Unit	
	Bienville R.D.	Strong River R.D.
1. Results compiled from data collected during the aerial phase of the evaluation		
Survey type	Aerial	Aerial
Date of aerial survey	9/23/76	9/23/76
Percent survey	50%	50%
Total acreage surveyed	382,820	
Total acreage of Forest Service land	86,340	90,730
Susceptible host type acreage of Forest Service land	74,750	63,055
Total number of spots within the survey boundary	203.0	156.9
Total number of spots on Forest Service lands	131.7	93.2
Spots per M acre of host type Forest Service lands	1.76	1.48
Average spot size (trees) Forest Service lands	9.0	4.94
Range of spot sizes (trees) Forest Service lands	1-60	1-30
Reds and faders/M acres host type on Forest Service lands	15.9	7.30
2. Results compiled from data collected during the ground and aerial phases of the evaluation:		
Date of ground phase	9/27/76	9/27/76
Infested trees per M acre of host type Forest Service lands	7.0	7.95
Total number of infested trees on Forest Service lands	520.3	501.6
Total volume of infested trees on Forest Service lands	52.88 MBF	43.9 MBF
Total number of affected trees on Forest Service lands	532.2	501.6
Total volume of affected trees on Forest Service lands	54.08 MBF	43.9 MBF
Ratio of green infested to total red and fading trees	0.11:1	0.57:1

Volume - BF - based on Scribner decimal C log rule. Cords converted to bd. ft. based on 500 bd. ft. per cord.

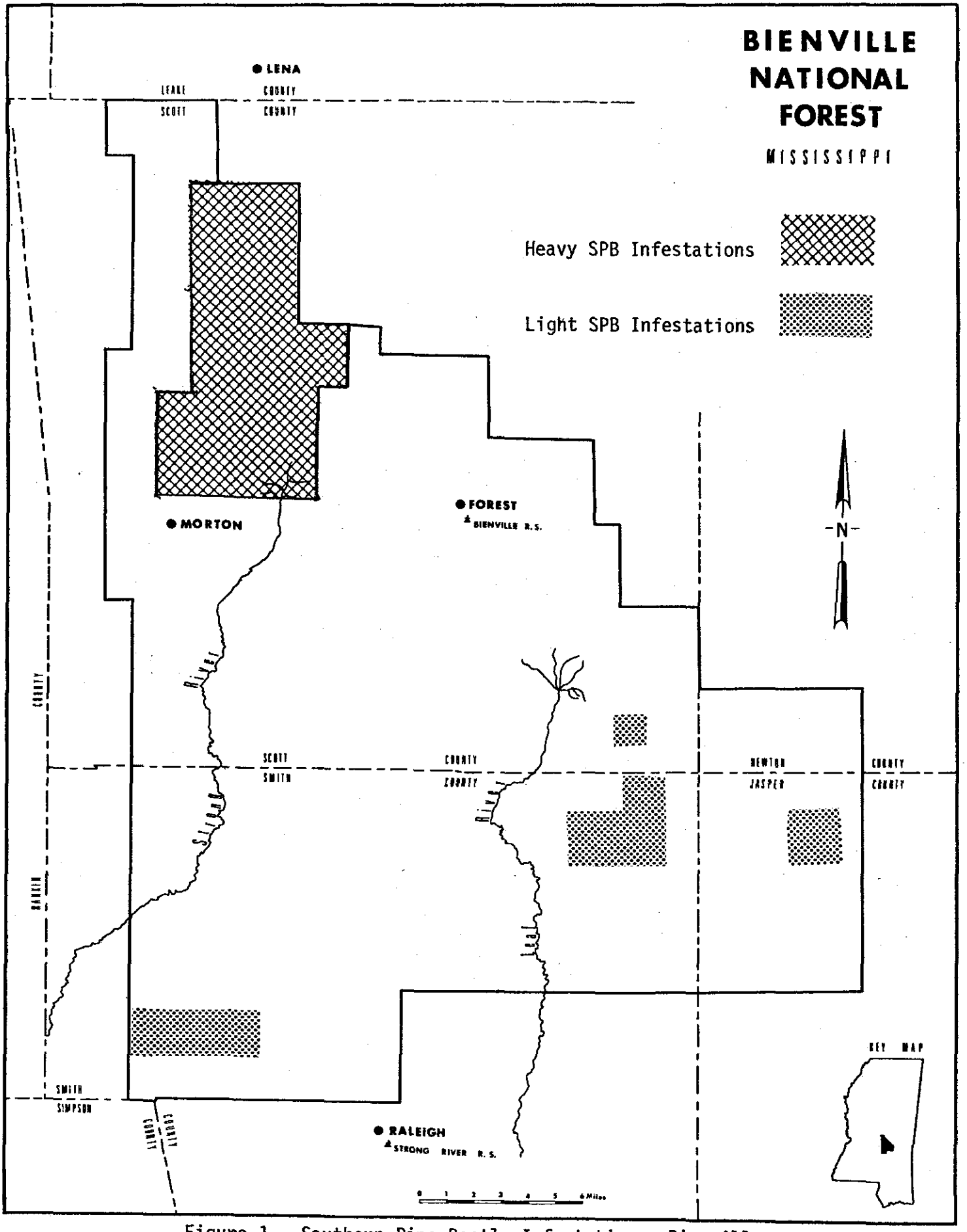

Figure 1. Southern Pine Beetle Infestations; Bienville National Forest, Mississippi.

The estimated total volume affected at the time of our evaluation on the Bienville R.D. was 54.1 MBF and 43.9 MBF on the Strong River R.D. This is in addition to the total volume salvaged during September 1976 which exceeded 201 MBF on the Bienville R.D. Planned salvage activities for October were to exceed 150 MBF. Currently, no salvage activities have occurred on the Strong River R.D.

The SPB has a very high biotic potential, and if conditions remain favorable for its development, this insect can cause widespread timber losses in a short period of time. On this area, the Bienville N.F., the potential exists for more extensive losses this fall and next spring, particularly on the Bienville R.D. Therefore, it is suggested that consideration be given to initiating suppression activities on the Bienville National Forest, Mississippi.

RECOMMENDATIONS

1. We recommend that primary SPB suppression efforts be initiated on the Bienville R.D. due to higher intensity and number of southern pine beetle spots observed on that District. Of next importance would be to control the SPB spots on the Strong River R.D. where the SPB's appear to be secondary invaders. Effective suppression tactics applied at this time on the Bienville N.F. should minimize the SPB population build-up.

2. Emphasis should be placed on controlling the larger spots in areas of heaviest infestation.

3. It is important to note the ratios of green-infested to red and fading trees listed above. These low ratios tend to indicate that the beetle populations are dispersing rather than expanding in spot size. Hence, if control is to be effective, it must be rapidly applied. As quickly as possible after aerial detection, spots should be ground checked and treated.

4. All control efforts should be carried out in accordance with guidelines set forth in FSM 5250, SA Supplement No. 8 and the Bienville National Forest Southern Pine Beetle Project Control Plan.

REFERENCES

1. Aldrich, R. C., R. C. Heller, and W. F. Bailey. 1958. Observation limits for aerial sketch-mapping southern pine beetle damage in the southern Appalachians. J. For. 56(3):200-203.